REMARKS

Applicants respectfully request entry of the foregoing and continued examination of the subject matter identified in caption, as amended, pursuant to and consistent with 37 C.F.R. § 1.111 and in light of the remarks which follow.

As noted in the Office Action Summary, claims 1-31 are currently pending. Claims 1-12 and 25-26 stand withdrawn. Claim 24 is amended herein to correct informalities. Thus, no prohibited new matter is presented herein.

Applicants note with appreciation that the drawings filed on October 16, 2003 have been accepted.

Informalities

The Office has noted that claim 24 and the Specification purportedly contain informalities. Applicants have corrected these informalities and submit that the amended claims and Specification are proper in accordance with U.S. practice.

Abstract

The abstract stands objected to because it purportedly improperly recites the title of the present application. Applicants have deleted the title recited therein. Applicants submit that the abstract as amended is proper in accordance with U.S. practice.

Double Patenting

Claims 13, 16, 18, 21, 23-24, and 29 stand provisionally rejected under the judicially created doctrine of obviousness-type double patenting as purportedly unpatentable over claims 23 and 33 of copending U.S. Patent Application No. 10/216,928 (U.S. Publication No. US 2004/0033496 A1). The provisional rejection is respectfully traversed.

Applicants respectfully request that this provisional rejection under the judicially doctrine of obviousness-type double patenting be held in abeyance until allowable subject matter is determined.

Claim Rejections Under 35 U.S.C. § 102

Claims 13-24 and 27-30 stand rejected under 35 U.S.C. § 102(b) as purportedly anticipated by Heller et al. (U.S. Patent No. 5,605,662) ("Heller"). The rejection is respectfully traversed.

To anticipate a claimed invention under 35 U.S.C. § 102, a reference must teach each and every element of the claimed invention. See *Lindeman Machinenfabrik GmbH v. American Hoist and Derrick Company*, 221 U.S.P.Q. 481, 485 (Fed. Cir. 1984). Applicants submit that Heller fails to recite each element of the claimed invention.

Heller describes a method of performing field-assisted hybridization in the detection of nucleic acid targets from a sample. With reference to claim 13, the Office asserts that Heller describes a metal electrode directly deposited in contact with the dielectric material, citing column 12, lines 55-67, and column 13, lines 1-25. It is respectfully submitted that these cited passages do not teach or suggest a metal electrode in direct contact with the dielectric material, as recited in claim 13.

Claim 13 recites a method of performing field-assisted hybridization in the detection of nucleic acid targets from a sample, comprising the steps of providing a reaction cell having an attachment surface formed of a dielectric material, providing a metal electrode in direct contact with said dielectric material, attaching nucleic acid capture probes to said attachment surface, adding the sample to the reaction cell, and providing an electrical potential to said electrode.

Contrary to the Office's assertions, Heller does not teach or suggest a metal layer in direct contact with the attachment layer, as recited in claim 13. Rather, Heller discloses two additional layers between the electrode and the attachment layers. These two layers include an oxidation layer and a permeation layer.

In support, Applicants direct the Office's attention to Figure 2 and column 10, lines 59-67 to column 11, lines 1-2. Heller describes the structure in Figure 2 as containing a metal layer (12), an oxidation layer (20), a permeation layer (22), an attachment layer (24), and a binding entity layer (26) (column 10, lines 59-64). Heller instructs that the permeation layer provides spacing between the metal surface and the attachment/binding entity layers (column 10, lines 64-67). To this end, Heller describes that the function of the permeation layer is to keep "the active microelectrode surface physically distinct from the binding entity layer of the micro-location" (column 13, lines 52-54). Therefore, Heller does not teach or suggest a metal layer in direct contact with an attachment layer.

In order to anticipate the present claims, the reference must disclose each element of the claimed invention. Because Heller does not teach or suggest a metal layer in direct contact with a dielectric attachment layer as recited in claim 13, Heller cannot anticipate the claimed invention.

Applicants further note that claims 14-17 and 27-30 are dependent upon claim 13. As discussed above with reference to claim 13, Heller does not teach or suggest a metal layer in contact with a dielectric attachment layer. Therefore, in light of the arguments above, Applicants submit that Heller does not anticipate claims 14-17 or 27-30.

With reference to claim 18, the Office asserts that Heller discloses a method of attracting or repelling electrically-charged entities to or from a surface of a reaction cell when performing a biological reaction (hybridization) comprising the steps of providing a dielectric material as said surface and generating an electric field by inducing charge-separation in said dielectric material, citing column 18, lines 23-36, and column 19, lines 21-44. It is respectfully submitted that these cited passages do not teach or suggest the steps of providing a dielectric material as said surface and generating an electric field by inducing charge-separation in said dielectric material, as recited in claim 18. Rather, these passages merely disclose the subject of hybridization.

Claim 18 recites a method of attracting or repelling electrically-charged entities to or from a surface of a reaction cell when performing a biological reaction. The claim further recites the steps of providing a dielectric material as said surface, and generating an electrical field by inducing charge-separation in said dielectric material.

In order to anticipate the present claims, the reference must recite each element of the claimed invention. Because Heller does not teach or suggest the steps of providing a dielectric material as said surface and generating an electric field by inducing charge-separation in said dielectric material, as recited in claim 18, Heller cannot anticipate the claimed invention.

Applicants further note that claims 19-22 are dependent upon claim 18. As discussed above with reference to claim 18, Heller does not teach or suggest the steps of providing a dielectric material as said surface and generating an electric field by inducing charge-separation in said dielectric material. Therefore, in light of the arguments above, Applicants submit that Heller does not anticipate claims 19-22.

With reference to claims 23-24, the Office asserts that Heller discloses a method of accelerating a detection process (rapid detection process) for biological molecules performed in a reaction cell, comprising the steps of providing a dielectric material as a surface of said reaction cell, and generating an electrical field by inducing charge separation in said dielectric material, citing column 18, lines 21-67.

As discussed above with reference to claim 18, Heller fails to teach or suggest the steps of providing a dielectric material as a surface of said reaction cell, and generating an electrical field by inducing charge-separation in said dielectric material, as recited in claims 18 and 23-24. Therefore, in light of the arguments above, Applicants submit that Heller does not anticipate claims 23-24.

In light of the above arguments, Applicants request that the rejection of claims 13-24 and 27-30 under 35 U.S.C. § 102(b) be withdrawn.

Claims 13, 15-16, 18, 20-21, 23-24, and 29 stand provisionally rejected under 35 U.S.C. § 102(e) as purportedly anticipated by copending U.S. Patent Application No. 10/216,928 (U.S. Publication No. US 2004/0033496 A1) ("Application No. 10/216,928"). The rejection is respectfully traversed.

Applicants respectfully request that this rejection under 35 U.S.C. § 102(e) be held in abeyance until allowable subject matter is determined.

Claim Rejections Under 35 U.S.C. § 103

Claim 31 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Heller et al. (U.S. Patent No. 5,605,662) ("Heller") in view of Gerdes et al. (U.S. Patent No. 6,291,166) ("Gerdes"). The rejection is respectfully traversed.

For a *prima facie* case of obviousness, the following three requirements must be met. First, the prior art relied upon, coupled with the knowledge generally available in the art at the time of the invention, must contain some suggestion or incentive that would have motivated the skilled artisan to modify a reference or to combine the reference with another reference. Second, the proposed modification must have had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the time the invention was made. Third, the prior art reference must teach or suggest all the limitations of the claims. The teachings or suggestions, as well as the expectation of success, must come from the prior art and not from applicant's disclosure. *In re Fine*, 837 F.2d 1071, 1074, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988); *Amgen, Inc. v. Chugai Pharm. Co.*, 927 F.2d 1200, 1209, 18 U.S.P.Q.2d 1016, 1023 (Fed. Cir. 1991); and *In re Vaeck*, 947 F.2d 488, 493, 20 U.S.P.Q.2d 1438, 1442 (Fed. Cir. 1991). Applicants respectfully submit that these criteria have not been met by the present Office Action.

Taken together, Heller and Gerdes fail to meet the requirements for a *prima facie* case of obvious. The cited references do not disclose or suggest each and every element of the claimed invention. Furthermore, Heller and Gerdes fail to suggest any motivation for one skilled in the art to modify or combine the teachings disclosed therein. From the disclosures in the cited references, a skilled artisan would not have a reasonable expectation of success to modify such disclosures therein. The failings of Heller and Gerdes, alone and in combination, are addressed in detail below.

The distinctions between the disclosures of Heller and the present invention, as discussed *supra*, are incorporated herein. In summary, Heller does not teach or suggest a metal electrode in direct contact with the attachment layer and fails to teach or suggest the steps of providing a dielectric material as said surface and generating an electric field by inducing charge-separation in said dielectric material, as recited in the pending claims.

Gerdes fails to satisfy the deficiencies of Heller. Gerdes discloses a method for irreversibly binding nucleic acid to a solid phase matrix. The Office states that Gerdes describes a solid surface comprising aluminum oxide, citing column 4, lines 1-5 and column 13, lines 19-53.

Here, Gerdes provides no information whatsoever as to the "particular form of the claimed invention or how to achieve it." *In re Eli Lilly & Co.*, 902 F.2d 943, 945, 14 U.S.P.Q.2d 1741, 1743 (Fed. Cir. 1990). Further, Gerdes, taken alone, or in combination with Heller, fails to teach or suggest a reaction cell providing a metal electrode in direct contact with the dielectric material and fails to teach or suggest the steps of providing a dielectric material as said surface and generating an electric field by inducing charge-separation in said dielectric material. Gerdes merely discloses binding nucleic acid to a solid phase matrix. To this end, as stated in the disclosure, the subject matter claimed in Gerdes is "directed to the binding of RNA to aluminum oxide and various uses for solid phase bound DNA and/or RNA" (column 13, lines 29-31).

Furthermore, Gerdes does not provide the motivation necessary under the *prima facie* obviousness analysis to modify the method of performing field-assisted hybridization as taught by Heller with the step of including aluminum oxide (Al_2O_3) as taught by Gerdes. The Federal Circuit, *In re Dow Chemical Co.*, instructs:

> The consistent criterion for determination of obviousness is whether the prior art would have suggested to one of ordinary skill in the art that this process should be carried out and would have a reasonable likelihood of success, viewed in the light of the prior art...Both the suggestion and the expectation of success must be founded in the prior art, not in the applicant's disclosure.

837 F.2d 469, 473, 5 U.S.P.Q.2d 1529, 1531 (Fed. Cir. 1988). The Court further explains:

> There must be a reason or suggestion in the art for selecting the procedure used, other than the knowledge learned from the applicant's disclosure.

837 F.2d at 473, 5 U.S.P.Q.2d at 1532. Because Gerdes merely discloses binding nucleic acid to a solid phase matrix, and fails to recite the other aspects of the present invention including the step of providing the metal electrode in direct contact with the attachment layer formed of dielectric material, and the steps of providing a dielectric material as said surface and generating an electric field by inducing charge-separation in said dielectric material, the *prima facie* case of obviousness cannot be satisfied.

The Office Action does not identify anywhere in the cited references any particular point of novelty of field-assisted hybridization that would suggest to the skilled artisan that combining the method of performing field-assisted hybridization as taught by Heller with the step of aluminum oxide as taught by Gerdes would successfully result in a method of performing field-assisted hybridization in the detection of nucleic acid targets from a sample, wherein the metal electrode is in direct contact with the attachment surface formed of a dielectric material, and the steps of providing a dielectric material as said surface and generating an electric field by inducing charge-separation in said dielectric material.

Because the disclosures presented in the cited references could not have led the skilled artisan to the method of performing field-assisted hybridization in the detection of nucleic acid targets from a sample, specifically, providing the metal electrode in direct contact with the attachment surface formed of a dielectric material, the *prima facie* case of obviousness cannot be satisfied.

In conclusion, Applicants submit that Heller and Gerdes, alone or in combination, fail to meet the requirements for a *prima facie* case of obviousness. The cited references fail to contain any motivation to modify said references, fail to disclose each and every one of the elements in the presently claimed invention, and further lack any reasonable expectation of success should the references be so viewed.

In light of the above, Applicants respectfully submit that the rejection under 35 U.S.C. § 103(a) be withdrawn.

CONCLUSION

From the foregoing, further and favorable action in the form of a Notice of Allowance is respectfully requested and such action is earnestly solicited.

In the event that there are any questions concerning this Amendment, or the application in general, the Examiner is respectfully requested to telephone the undersigned attorney at (703) 838-6684 so that prosecution of the application may be expedited.

Respectfully submitted,

BUCHANAN INGERSOLL PC
(INCLUDING ATTORNEYS FROM BURNS, DOANE, SWECKER & MATHIS)

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